

Trends in Support and Expenditures For Medical Research, 1941-52

By IRVING LADIMER

IN ROUND NUMBERS, our Nation paid \$173 million for medical research in 1952 (the latest year for which analyses are available)—four times the amount spent 12 years ago. The largest share, \$73 million or about 42 percent, was the Federal Government's contribution. Medical research, however, came to less than 5 percent of the total investment in all scientific research and development. And Government's 42-percent support of medical research compares with Federal financing of 60 percent of all research.

In this country, substantial public and private backing of medical research dates back to the beginning of this century. Previously, support of learning went mostly to general education, religious teachings, and the humanities. Medical research, however, was not without its champions and donors. As far back as 1801, Dr. David Ramsey, in an address before the South Carolina Medical Society, noted with considerable interest the increase in giving and the beginning of organized research and support in England (1):

"Two novel institutions of this kind, the first the world has ever seen, reflect equal honor on England and the 18th century. One has been lately instituted for ascertaining, by experi-

ments, the precise effects of the newly discovered elastic fluids. The other, for the relief of cancerous patients, in which it is intended to give the utmost scope to medical ingenuity for discovering the best plan of treating that hitherto incurable disease. For this last purpose, one gentleman has lately given £3,000."

Public confidence in medical research was widely stimulated, and has never since flagged, by the dramatic discoveries of Pasteur and Koch which first revealed the tremendous possibilities of controlling disease through research. Interest and esteem rose with improvements in medical education following the Flexner report of 1910, and with realization of the results of successful coordination of clinical and biological work under the leadership of Sir William Osler at Johns Hopkins (2). Notable, also, was the evolution of the Public Health Service, after about 1910, into a truly national health agency.

It would be difficult, if not erroneous, to cite one cause or even major causes for the recent impetus in expenditures for medical investigation, both public and private. Any such list would undoubtedly include the greater public sensitivity to science, manifested in fear and hope generated by the atomic bomb, the general increase in public education and information, higher incomes, and tax regulations favoring nonprofit support. The remarkable scientific advances of the decade and the World War II achievements in meeting problems of military and civilian medicine have also made deep impressions.

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Most of this wartime research was coordinated and supported by Federal agencies. The Government's program of research in its own laboratories and, to a vastly greater extent, through contracts with universities, research centers, and industry demonstrated that military losses could be reduced or often completely avoided (3). Nearly \$25 million was spent on medical projects during 4 war years by the United States Committee on Medical Research of the Office of Scientific Research and Development (OSRD). Expenditures reached a peak of \$7 million during 1 year alone for projects of direct military interest (4). Parenthetically, funds for medical research were only 5 percent of the total OSRD investment in science to win the war.

Strong recommendations to continue "the war of science against disease" after close of hostilities were issued by Dr. Vannevar Bush (5), wartime director of OSRD. He particularly emphasized that "if we are to maintain the progress in medicine which has marked the last 25 years, the Government should expand financial support to basic research in the medical schools." Bush declared that it is "the special province" of the schools to foster research. He further recommended continuing support of medical research by the Government "if the concerted efforts of medical investigators which have yielded so much of value during the war are to be continued on any comparable scale during the peace." His report estimated that medical schools could effectively use \$5 to \$7 million during the postwar period for research and that a proposed national research foundation be empowered eventually to distribute \$20 million annually for medical research.

With some ebb in special areas, both medical research and general scientific effort have flowed onward in increasing stream. By 1952, support had reached its highest point, and, likewise, expenditures representing work accomplished attained their peak.

General Scientific Research

Activity in the health sciences is best understood in the historical perspective of the total research and development effort of our Nation. The panorama exhibits fairly small but steady

expenditures for science before the war, rising to peaks during the period of hostilities, followed by continuing growth through the immediate postwar and current periods, but with some decline in rate of growth. Price increases during this period also required greater expenditures; thus, research activity did not increase to the same extent as the increase in financial support. It is noteworthy that since the beginning of World War II, research expenditures have increased at a faster pace than general economic activity (6). Expansion both in research costs and in the gross national product (the market value of the output of all goods and services) reflects in part the decreasing values of the dollar.

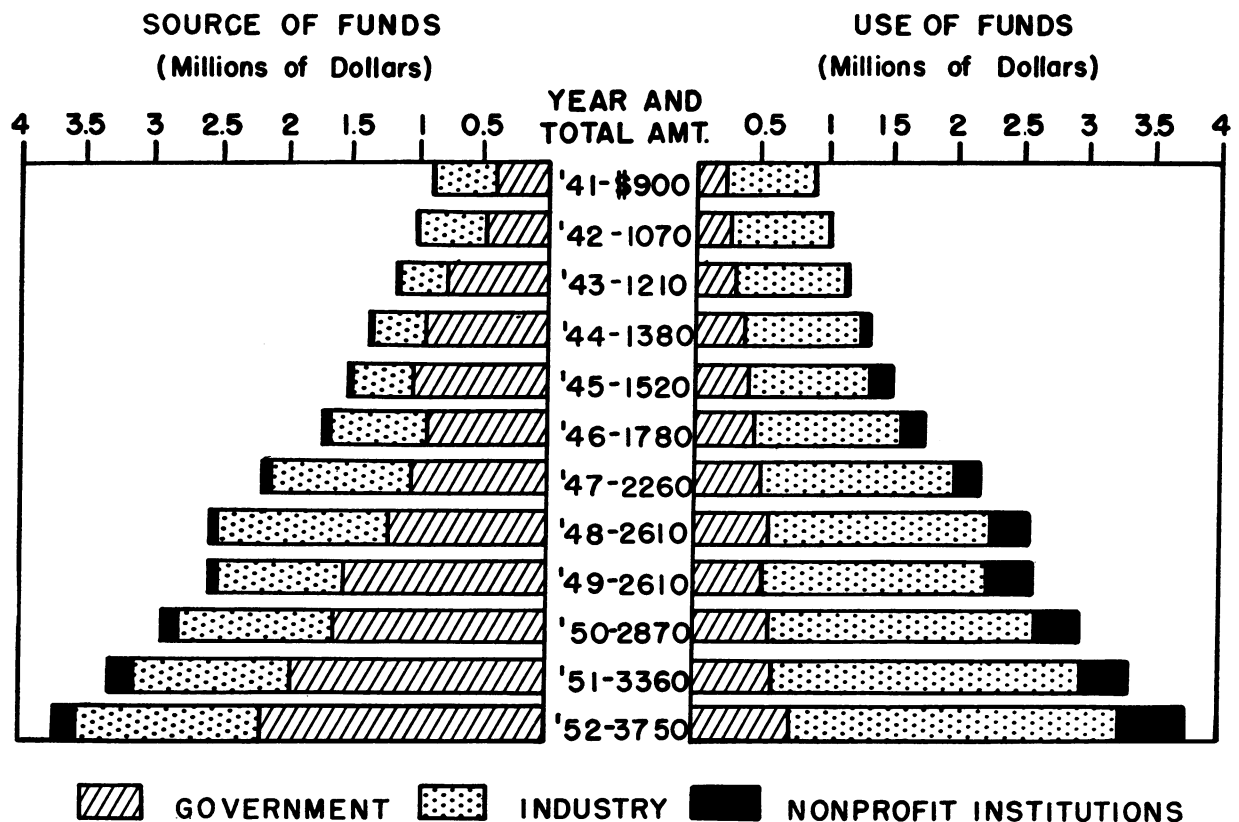
Support

There has been a fairly steady rise in total research financing since 1941, according to a Department of Defense study (6), but with some significant shifts among the main supporters (fig. 1). Before World War II, industry financed the bulk of research, but during and after the war, the Government assumed this position, supplying about 70 percent of all funds at the war's end, 1945. Nonprofit institutions contributed between 2 and 3 percent throughout this period, thus keeping pace with the general increase. The 1952 support for all research and development, totaling \$3,750 million, represented over 10 percent more than the outlay for the preceding year and a 30-percent rise since the beginning of the Korean conflict in 1950. The last decade saw also the phenomenal growth of mass-supported voluntary organizations which contributed to research support, almost exclusively in the health fields.

Personnel

The corps of scientists and engineers has not grown at the same rate as expenditures. The dollar rise, although representing the higher cost of more and more complex weapons and industrial requirements, also reflects decreasing purchasing power; manpower has therefore not necessarily increased proportionately. According to the Department of Defense study (6), the number of engineers and scientists roughly doubled between 1941 and 1952—from 87,000 to 180,000—while, as noted, expenditures quadru-

Figure 1. National research support and performance, 1941-52.



SOURCE: Reference 6.

pled. Research manpower has grown at a fairly constant and rapid rate despite temporary decreases in research expenditures by Government and industry during the 12-year span.

Performance

In performance of research, measured by dollar volume, nonprofit institutions, such as universities and research centers, demonstrated the most rapid growth. Their share of activity increased from 5 percent in 1941 to 11 percent in 1952 (fig. 1). Employment of scientists in these institutions rose from 8,000 to 29,000 during the 12-year period. The Department of Defense report explains that these institutions, which "have traditionally performed the Nation's basic research, in the last few years have taken on many military research projects."

Comparisons in Research Support

Since 1941, medical research expenditures have been about one-twentieth of the Nation's

total outlay for research and development. Sources of support for medical studies changed markedly, however (table 1 and fig. 2). Impressive at once is the share assumed by the nonprofit and philanthropic agencies on behalf of medical research. Even before the war, nonprofit groups contributed well over a third of the medical funds, in contrast to about 2 percent for research generally.

War Period

During the war, in 1944, the shift toward more Federal support was evident in all fields of research, but with greater impact in the general research and development area which was heavily weighted by physical sciences and military development. For the Nation's research undertaking as a whole, Government support equalled 68 percent of the total \$1,380 million, about 3 times its prewar expenditure. In medicine, there was a similar tripling of outlay, but the Federal share was only 16 percent of the \$60 million estimated total.

Postwar Period

Following the war, in 1947, funds for both general and medical research continued to rise; Government assumed about half the \$2,260 million for support of science generally and about a third of the \$88 million for medical research, Government funds accounting for virtually all of the increase in the medical field. The share of the nonprofit organizations in financing general research and development, as noted, remained at about 2 percent but rose slightly in the medical field, from 24 percent of the total expenditure in 1944 to 28 percent in 1947.

Current Period

In 1952, the search for and application of scientific knowledge consumed about \$3,750 million, more than 1 percent of the gross national product.

In the consolidated national science effort, there were 3 main sources of support: the Federal Government, which financed about 60 percent; industry, about 38 percent; and nonprofit organizations, chiefly colleges and universities and their affiliated research centers, about 2 percent (table 1). And this aggregate does not credit the direct contributions of State and

local agencies or the millions of hours of free service contributed by physicians, nurses, and technicians whose work advances and makes possible biological and medical research. There are as yet no dollar data on these contributions, but their importance has been recognized. The Steelman report of 1947 (4) stated, "The modest sums which State and local governments have provided for research in medical and allied sciences have been allotted chiefly to State universities and medical schools, and to public health and welfare departments." No estimate of these funds was made, however. The National Science Foundation will attempt to obtain such data in its forthcoming national survey, and the American Medical Association's Council on Research has recently polled physicians and medical scientists to determine the magnitude of such research.

Use of Funds, 1952

Although the bulk of all research funds in 1952 was supplied by the Government, Federal laboratories performed about a fifth of all work. Of the congressional appropriation of \$2,240 million in 1952, Government agencies

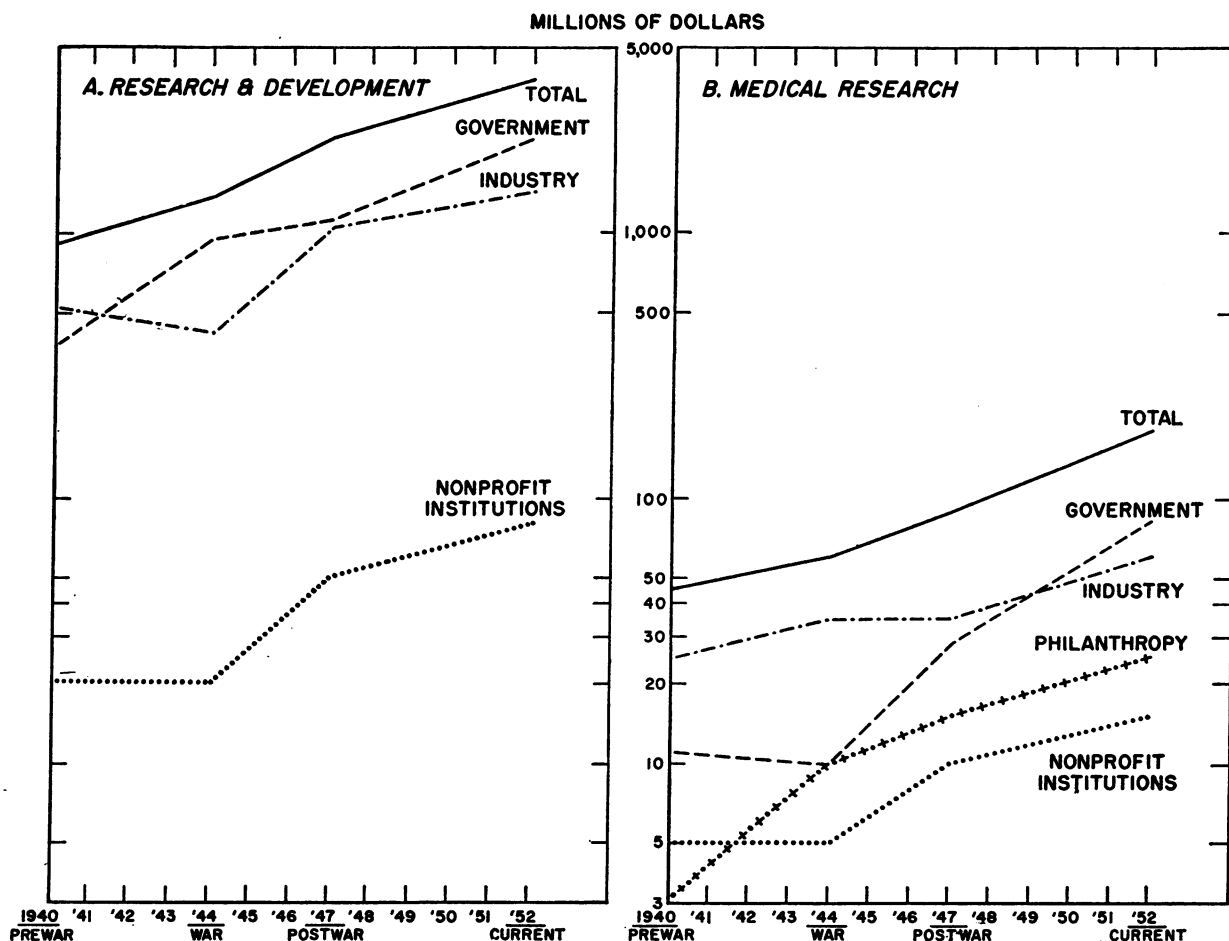
Table 1. General and medical research support, 1941-52

[Millions of dollars and percent distribution]

Source of funds	1941		1944		1947		1952	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
General research								
Government.....	\$370	41	\$940	68	\$1, 160	51	\$2, 240	60
Industry.....	510	57	420	30	1, 050	47	1, 430	38
Nonprofit.....	20	2	20	2	50	2	80	1 2
Total.....	900	100	1, 380	100	2, 260	100	3, 750	100
Medical research								
Government.....	\$3	7	\$10	16	\$28	32	\$73	42
Industry.....	25	55	35	60	35	40	60	35
Philanthropy.....	12	27	10	16	15	17	25	14
Other nonprofit.....	5	11	5	8	10	11	15	9
Total.....	45	100	60	100	88	100	173	100

¹ Estimated division: philanthropy, 0.5 percent; schools and research institutions, 1.5 percent.

Figure 2. Support of general research and development and of medical research, 1940-52 (selected years).



used about a third in their own laboratories and contracted or granted the remainder. Industrial contracts, mainly for applied or developmental defense projects, absorbed over half the Federal outlay (table 2).

Industry performed over two-thirds of the work, as measured in terms of money expended, utilizing \$1,390 million of industrial funds and \$1,140 million of Federal funds. Nonprofit institutions contributed about 2 percent of all funds, but spent 11 percent of the research funds. The Government thus depends on industry chiefly and on nonprofit agencies to conduct research and development. This pattern has developed primarily in response to military needs and is not typical of specialized areas such as medical research. A small amount of industrial and nonprofit agency funds was accepted by Government agencies, mainly in the form of gifts or grants for special projects or

individual fellows or scientists. Such outside support of Federal activity is too diffuse and small to be significant.

The Department of Defense study (6) calculates that 180,000 engineers and scientists, roughly a fourth of all our scientific manpower, were engaged in research and development in 1952. This total was derived by dividing average costs per worker into total expenditures. Since medical research costs totaled about 5 percent of the national investment in science and cost for support of medical scientists is somewhat lower than that for other scientists and engineers, perhaps about 12,000 physicians, scientists, technicians, and others worked in the field of medical research.

In general, distribution of the 180,000 scientists and engineers corresponded roughly to the funds used by each of the 3 participating groups, with a somewhat higher proportion in

the nonprofit sector. On the basis of average costs per worker in Government, in industry, and in the nonprofit institutions and colleges, the Department of Defense study estimated that these groups employed, respectively, 33,000, 118,000, and 29,000 scientists and engineers. Thus, these groups, which used, respectively, 21 percent, 68 percent, and 11 percent of the total funds, employed 18 percent, 66 percent, and 16 percent of the scientific manpower.

Medical Research Support, 1952

The \$173 million spent on medical research in 1952 came from the same three principal sources which supported general scientific research: the Federal Government, industry, and nonprofit organizations. (This total compares with \$181 million for 1951 (7), the larger figure resulting chiefly from crediting all of the Atomic Energy Commission expenditures for biological studies as contributions for medical research.) Contributions in the medical field from nonprofit organizations, however, have been separated into those from philanthropy—foundations, trusts, and voluntary organizations such as the American Heart Association and the American Cancer Society—and those from schools, hospitals, and other institutions. Of the 4 participants in 1952, Government assumed the largest portion, 42 percent, and educational and other institutions, the smallest, 9 percent (table 1). This contrasts with 60- and 1.5-percent participation by these groups in support of general research.

Medical research attracted a far greater pro-

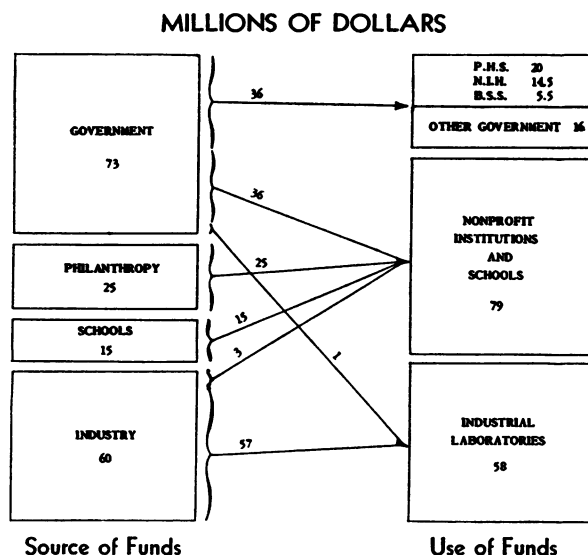
Table 2. General research support and performance, 1952

[Millions of dollars]

Source of funds	Use of funds			
	Government	Industry	Non-profit	Total
Government.....	\$800	\$1, 140	\$300	\$2, 240
Industry.....		1, 390	40	1, 430
Nonprofit.....			80	80
Total.....	800	2, 530	420	3, 750

SOURCE: Reference 6.

Figure 3. Medical research support and performance, 1952.



portion of support from educational and other nonprofit institutions than did all research in 1952 (table 1). Of \$50 million applied by the schools to all types of research, about a third, \$15 million, was used for medical research.

Industry

The industrial contribution is estimated at \$60 million, but this figure is probably conservative since it is believed that pharmaceutical firms alone spent about \$50 million, mainly in the medical field (8-10). The industrial contribution to scientific research, although "by far the largest segment of the Nation's scientific research activity" according to a recent Department of Labor study (11), is the most difficult to estimate precisely. The Department of Labor undertook a nationwide survey of research and development for the Department of Defense in mid-1952 and obtained costs and personnel data by industry and type of research. For 1951, industrial expenditures for "basic and medical sciences" totaled \$147 million of which about \$66 million may be roughly attributed to medical research. This figure is closely comparable to the estimate used here, in view of differences in definition and widely varying industrial practices.

Three million dollars as the amount allocated by industry in 1952 to nonprofit organizations (fig. 3) is probably a fairly accurate estimate

of gifts and contracts made directly, not through an intermediary. This sum does not, however, cover substantial donations of corporations to fund-raising organizations which, in turn, supply funds for research. Contributions of the latter are credited as nonprofit support. For instance, the contributions of the Life Insurance Fund for Medical Research, of the Sugar Research Corporation, and of the Nutrition Foundation, all wholly industry supported, and the contributions of the corporation foundations established by pharmaceutical firms are counted as deriving from nonprofit sources. This growing technique in industrial philanthropy (12, 13) will require refined studies in the future in order to identify realistically industrial and other sources.

Nonprofit Organizations

Philanthropy supports a very small proportion of research generally, but it supports a substantial fraction of research in the medical field. Included in this category are not only the foundations, general and industry-sponsored, but also the voluntary organizations. These organizations serve almost exclusively in the health field, building, inspiring, and encouraging work and contributions to combat a specific disease. Primarily interested in education and, to some extent, in meeting costs of medical care, they also finance program research in medicine. In 1952, it is estimated that over \$12 million was contributed by voluntary organizations for research in some of the most significant disease areas:

	<i>Millions of dollars</i>
Cancer.....	\$5.3
Heart.....	1.6
Arthritis and metabolic diseases.....	1.0
Mental health.....	.3
Neurological diseases (including poliomyelitis and blindness).....	4.0

The balance of the \$25 million contributed by philanthropy came mainly from similar agencies supporting other fields (tuberculosis and aging, for example) and from the industry-financed groups. Precision in estimating contributions in this area is exceedingly difficult because of the numerous small foundations, individual gifts, and the variety of support tech-

niques employed. These sums are significant in aggregate but are not easily allocated. The total given is very conservative (14-16).

Analysis of nonprofit support reveals the significant shift from endowment income to corporate and voluntary contributions as major current sources of medical research funds, primarily those donated to colleges and universities.

Reports on expenditures and nature of research supported have been fragmentary and, although more and better data are now available than heretofore, it is extremely difficult to present a comparative picture. Perhaps the best analysis, based on admittedly incomplete data, of grants made by public and private agencies during 1946-51 was prepared by the National Research Council (17). That report significantly stated as its first conclusion, "Increasing governmental support of medical research has not diminished funds from private sources."

Comparisons in Research Performance

In 1941, before the Federal Government supported research extensively, industrial laboratories performed almost three-quarters of the general research, as measured by dollars spent, and Government laboratories, less than a quarter (fig. 1). Only 5 percent—\$40 million—was used by nonprofit groups, over half of which was financed from other sources. These relationships remained about the same during the prewar period, with the gradual emergence of schools and research centers as fiscally important participants. By 1944 and 1945, these nonprofit institutions performed 6 to 7 percent of research and development in terms of expenditures; at war's end, 7 to 8 percent; and currently, about 11 percent of all research. As noted earlier, a large part of this rise resulted from their increasing acceptance of military contract research.

The performance picture for medical research has always been radically different from that for general scientific research. In 1952, although the laboratories of nonprofit institutions performed only about 11 percent of the Nation's total research and development, they performed about half of all medical research.

Table 3. Expenditures of Federal agencies for medical research, 1952

[Thousands of dollars]

Agency	Life sciences ¹	Medical research			
		Total	Internal	External	
				Nonprofit ²	Industry
Department of Health, Education, and Welfare.....	\$39, 176	\$38, 863	\$20, 250	\$18, 598	\$15
Department of Defense.....	37, 878	22, 100	12, 000	9, 100	1, 000
Atomic Energy Commission.....	22, 538	8, 513	521	7, 992	0
Veterans Administration.....	3, 872	3, 872	2, 572	900	400
Tennessee Valley Authority.....	2, 392	8	4	4	0
National Science Foundation.....	869	113	0	113	0
Total.....	106, 725	73, 469	35, 347	36, 707	1, 415

¹ Data from reference 18. ² Based on data from National Science Foundation, Federal Funds for Science, I. Federal Funds for Scientific Research and Development of Nonprofit Institutions, 1950-1951 and 1951-1952, Washington, D. C., U. S. Government Printing Office, 1953, p. 40, table F.

About a fifth of all medical research was conducted in Federal laboratories, and about a third in industrial laboratories (fig. 3). These proportions are rough, but they reliably indicate orders of magnitude.

Federal Support and Performance

The Federal effort has proceeded through specialized agencies which conduct research, generally along with their functions for health maintenance and medical care, and which also have authority to contract for or support research outside their own laboratories and clinics. Of the \$73.5 million which the Government allotted to medical research in 1952, slightly less than half (\$35.3 million) financed research in Federal laboratories, and a little more than half (\$38.1 million) was distributed in the form of contracts, grants, and other outside funds, almost all to nonprofit organizations (table 3).

Until 1937, according to the President's Scientific Research Board (4), "virtually all Federal medical research was conducted by Federal agencies in their own laboratories." In 1947, more than half of Government medical research funds was spent by Federal laboratories. Today, more than half of the Federal funds is spent on extramural activities.

The National Science Foundation reports six Federal agencies which undertake medical research of some consequence (18). Figures are

in part derived from those collected for a wider range of activity covering the "life sciences," which include the biological, medical, and agricultural sciences. Medical sciences are those which, "apart from the clinical aspects of professional medicine, are concerned primarily with the utilization of scientific principles in understanding diseases and improving health." Calculations from the agencies listed indicate that medical research constituted over two-thirds of this "life science" total (table 3).

Estimates by the National Science Foundation for fiscal 1953 show some increase in life science research, but the largest increase projected is in the physical science area; a slight decline is estimated in the social sciences.

Although Government appropriations for fiscal 1954 register a further increase for medical research not generally true for other health activity, research funds will at most reach 4 to 5 percent of \$1,775 million, as estimated in the American Medical Association's review of the Federal budget (19). For the most part, Government health dollars go for hospitalization, medical care, and disease control, and are divided between direct operations and various payments to non-Federal agencies.

Intramural Research

The \$35.3 million devoted to medical research in Federal installations during 1952 represents activity of only 5 agencies. The Public

Health Service spent \$20.3 million, or almost 60 percent of the total. Research in the laboratories of the National Institutes of Health absorbed three-fourths of the Public Health Service total, the balance going mainly for studies and surveys of the Bureau of State Services. A small amount, not over \$25,000, covered clinical studies in the Service hospitals. In these allocations, medical research was fairly strictly defined, excluding vital statistics analysis, engineering and physical research, and allied disease control and social science studies.

Among other agencies prominently engaged in medical research were the Department of Defense and the Veterans Administration, the latter spending about \$917,000 on prosthetics studies alone. The \$521,000 listed by the Atomic Energy Commission as internal research represents the cost of administering the isotope distribution program. Otherwise, the Atomic Energy Commission supports medical and biological activity through contract arrangements with its "on-site" installations and "off-site" colleges, universities, and research centers. Although the former, including Argonne National Laboratory, Brookhaven National Laboratory, and Oak Ridge Institute of Nuclear Studies, are operated and closely controlled by the Commission, technically these units receive contracts for research and development and are thus not considered Government laboratories in the same sense as those at the National Institutes of Health or at Veterans Administration and Department of Defense centers. Atomic Energy Commission biological research totaled \$10.8 million in 1952. This program, although related to medical research, is not included in this report.

Extramural Research

In 1952, Federal agencies distributed \$38.1 million for medical research. The grant and contract programs are administered by the same agencies engaged in internal research, with the significant addition of the National Science Foundation. In 1952, its third year of operation, this agency, which is primarily dedicated to aiding fundamental investigation, granted \$113,000. The Atomic Energy Commission granted \$8 million, and the Tennessee

Valley Authority had a \$4,000 contract to one university for research on fluorine, equaling its internal expenditure for related investigations. The bulk of extramural money, however, came from the Public Health Service and the Department of Defense. Together they accounted for over four-fifths of Federal outgoing funds.

Support and Purchase

"It is important to distinguish between two different motivations which may prompt the Federal Government to sponsor research and development. In one instance, the Government's purpose may simply be to increase the body of scientific knowledge. In this case, the Government is supporting scientific activity. However, if it is seeking specific information to assist in carrying out a program (other than the support of research and development) for which it is responsible, the Government is then purchasing scientific services. Although in the latter case, the specialized nature of the object, the production of new knowledge may soften or blur the character of the negotiation, the relationship between the Government and the contracting institution is essentially that of buyer and seller (20)." This difference, as summarized by staff members of the National Science Foundation, must be recognized in evaluating the nature and magnitude of the Federal extramural programs.

The National Science Foundation estimates that of all Federal funds which went to non-profit organizations alone, only about 20 percent were for "support," the remainder being used to "purchase" research findings. In medicine, this ratio is more likely reversed. The largest extramural program, that of the Public Health Service, by itself accounts for and stamps half as in "support" of research projects. This program finances projects based on applications from outside investigators engaged in research in the many fields related to health and disease (21). Similarly, although the defense agencies use the contract mechanism, a substantial portion of their funds, especially funds administered by the Office of Naval Research, are "grants" to support basic inquiry. The Veterans Administration is authorized to enter into contracts or agreements with private and public agencies or persons.

Its extramural program of medical research is conducted with the primary objective of providing the veteran patient with the best possible medical care. Research is undertaken with the advice of the National Research Council, and individual projects are supported under reimbursable contracts with the institution at which the investigation is conducted. The present contractual program is intended to obtain information more economically or advantageously than is possible by investigations at Veterans Administration facilities.

Questions concerning methods of financing medical research, particularly at colleges and universities, have been raised by administrators and educators as well as scientists. Federal support of medical investigation, and of scientific studies generally, is of relatively recent origin. Policies relating to research grants and contracts are in a state of evolution. Interested agencies at both the supporting and receiving positions are seriously studying the many problems arising from a rapid increase in the volume of funds for medical research (22, 23).

Recipients

Virtually all the Federal medical dollars go to nonprofit organizations. The National Science Foundation classifies these broadly into educational institutions, hospitals and related institutions, independent research organizations, special research organizations (legally independent agencies formed at Government initiative and largely concerned with Government research), and miscellaneous organizations such as professional and trade organizations, public and governmental units, and cultural activities. Federal medical grants to nonprofit agencies were channeled mainly to educational institutions and hospitals and related institutions.

Some indication of the meaning or value of this support to the schools and hospitals may be obtained from a recent review of the Public Health Service grant program (24). It is stated that in the decade 1940-50 in which medical research has made rapid strides, the Federal Government has emerged as a major source of financial support. The pool of trained manpower increased as did the rate of scientific pub-

lication. Research activity is somewhat more widespread. Congressional earmarking of support for selected problems, even though broadly defined, has emphasized research on problems broadly relevant to specified diseases, such as cancer, cardiovascular disease, and mental illness.

Insofar as a quantitative impact on medical schools, specifically, may be measured, a report on the Public Health Service grant program (25) states: "In the fiscal year 1947-48, about \$4.2 million, or nearly one-fourth of all expenses for research budgeted separately in 4-year schools, represented research funds granted by the Public Health Service. These grants accounted for all the expenses for separately budgeted research in one school." The schools reported that not only the research function but also the teaching and training functions were aided by this form of Government support.

Although industry received a lion's share of all Federal funds for research and (mainly) development in 1952, it obtained only \$1.5 million in the medical area, almost all from the defense and veterans agencies. Pharmaceutical houses, instrument and scientific equipment laboratories, chemical firms, and special research centers were the chief recipients of contracts for the development of drugs, appliances, and special-purpose studies.

Summary and Comment

The contributors to medical research and participants in its performance have been substantially those which have played significant roles in the national research enterprise: the Federal Government, industry, and nonprofit groups. In support of all research, including medical investigation, the Federal Government has over the years assumed an increasingly larger share. Its contribution for medical research has been proportionately less than its contribution for general research, but it has increased at a faster rate. The current volume of Federal support for medical research is more than matched by that of other sponsors, notably industry and philanthropy.

In the use of research funds, nonprofit organizations, especially educational institutions, have increased their participation and, particu-

larly in medicine, have greatly enlarged their traditional role as principal conductors of research.

Support for medical research has remained at about 5 percent of the national total research support over the period 1941-52.

Medical research has largely been "supported," receiving financial assistance largely without policy or program control, whereas other research and development has been mainly "purchased" by Government and by industry to meet special needs.

This résumé of support and performance of medical research in terms of funds employed emphasizes the need for complete and comparable data. Not only is budgetary information in many areas nonexistent, but definitions and concepts are widely different. In view of the growing importance of medical and other research activity, it is satisfying to note the interest in establishing baselines and series which will indicate patterns and trends.

For this review, reliance had to be placed on fragmentary and uncoordinated materials. The best available published sources were used, but it was recognized that the selection of one authority or set of data from among conflicting reports presented some risk. It is believed, however, that the data used provide measures of trends and orders of magnitude sufficient for an evaluation of the relative participation of the principal groups in support and performance of medical research.

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